CLAIMS

1. A position sensor comprising:

first and second members which are movable relative to each other along a measurement path, the first member comprising an excitation winding and the second member comprising first and second resonators spaced apart along the measurement path;

an excitation signal generator operable to generate an excitation signal and to apply the excitation signal to the excitation winding to induce a first resonant signal in the first resonator and a second resonant signal in the second resonator; and

means for analysing the first and second resonant signals to determine a value representative of the relative position along the measurement path of the first and second members,

wherein the excitation winding and the first resonator have a first electromagnetic coupling which varies with the relative position along the measurement path of the first and second members in accordance with a first function, and the excitation winding and the second resonator have a second electromagnetic coupling which varies with said relative position in accordance with a second function different from the first function,

and wherein the first resonator is operable to introduce a first phase shift into the first resonant signal and the second resonator is operable to introduce a second phase shift, which is different from the first phase shift, into the second resonant signal.

2. A position sensor according to claim 1, wherein said analysing means comprises a sensor winding electromagnetically coupled to the first and second resonators, wherein in response to the excitation signal

being applied to the excitation winding, there is generated in the sensor winding an electric signal corresponding to a combination of the first and second resonant signals weighted in accordance with the relative position of the first and second members along the measurement path; and

a signal processor operable to process the electric signal generated in the sensor winding to determine a value representative of the relative position along the measurement path of the first and second members.

3. A position sensor according to claim 1 or 2, wherein the excitation winding and the first and second resonators are arranged so that said first and second functions vary sinusoidally with position with the same period but are out of phase with each other.

4. A position sensor according to claim 3, wherein the first and second functions are one quarter of a cycle out of phase with each other.

5. A position sensor according to any preceding claim, wherein the first resonator exhibits resonance in response to a first range of frequencies about a first resonant frequency and the second resonator exhibits resonance in response to a second range of frequencies about a second resonant frequency which is different from the first resonant frequency, the first and second ranges overlapping,

wherein the excitation generator is operable to generate an excitation signal having a frequency component which induces the first and second resonant signals in the first and second resonators respectively.

6. A position sensor according to any preceding claim,

wherein the first phase shift is different from the second phase shift by one quarter of a cycle.

7. A position sensor according to claim 6, wherein the analysing means is operable to measure a phase of a signal formed by a weighted combination of the first and second resonant signals.

8. A position sensor according to claim 7, wherein the analysing means is operable to generate a second signal at a frequency different from that of the excitation signal, and to mix the second signal with the signal formed by a weighted combination of the first and second resonant signals to generate a third signal having a frequency component equal to the difference between the frequency of the excitation signal and that of the second signal, and to determine the said value from the phase of the third signal.

9. A position sensor according to any preceding claim, wherein the first and second members are relatively movable along a rectilinear direction.

10. A position sensor according to any preceding claim, wherein the excitation winding is formed by a conductive track on a planar substrate.

11. A position sensor according to claim 10, wherein the planar substrate is a printed circuit board.

12. A position sensor according to either claim 10 or claim 11, wherein the excitation winding effectively comprises a plurality of loops arranged so that current flowing through the excitation winding flows around at least one of the loops in an opposite direction to at

least one other of the loops.

13. A position sensor according to any preceding claim, wherein at least one of said first and second resonators comprises a passive resonant circuit.

14. A position sensor according to any of claims 1 to 12, wherein at least one of said first and second resonators comprises an amplifier for amplifying the power of a signal induced in the resonator.

15. A position sensor according to any preceding claim, wherein the first and second resonators comprise respective conductive tracks formed on a planar substrate.

16. A position sensor according to claim 15, wherein the planar substrate is a printed circuit board.

17. A position sensor according to any of claims 2 to 16, wherein the sensor winding is formed by a conductive track on a planar substrate.

18. A position sensor according to claim 17, wherein the sensor winding is formed on a printed circuit board.

19. A position sensor according to claim 17 or 18, wherein the sensor winding is formed in a single loop.

20. A position sensor according to any preceding claim, wherein the excitation signal comprises a sinusoidal component at 1 MHz.